

A NEW SPECIES OF *PERODERMA* HELLER (LERNAEOCERIFORMES: COPEPODA) FROM SARDINES OFF THE PORTO NOVO COAST, INDIA¹

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(With fourteen text-figures)

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A new species of parasitic copepod (Lernaeoceriformes), *Peroderma sardinellae* sp. nov. was recorded from sardines netted in the Bay of Bengal off the Porto Novo coast of India. *Peroderma sardinellae* sp. nov. is a fish borer with anastomosing rhizoid-like structures to anchor itself in the bore and to absorb nourishment from the host. The female parasite has two elongated egg strings hanging out of the bore and the body of the parasite is buried inside the bore.

INTRODUCTION

The genus *Peroderma* Heller (Lernaeoceriformes, Copepoda) includes only two valid species so far, namely *P. cylindricum* Heller and *P. tasselum* Bennet. *P. branchiata* recorded by Basset Smith (1898) was synonymised as *P. cylindricum* by Wilson (1917), who recognised only a single species, *P. cylindricum*, under the genus *Peroderma*. Bennet and Chellam (1977) described a new species, *P. tasselum* from Indian waters. In the present observation on sardines, twenty six female specimens of the genus *Peroderma*, different from *P. cylindricum* and *P. tasselum*, were collected and are described as a new species. Yamaguti (1963) and Pillai (1965) give comprehensive reviews of the genus *Peroderma*. Detailed descriptions of *P. cylindricum* from Indian waters by Bennet (1961) and *P. tasselum* by Bennet and Chellam (1977) facilitate the comparison of *P. cylindricum* and *P. tasselum* with the present species.

MATERIAL AND METHODS

An infestation of *Peroderma* was observed on the sardines *Sardinella albella*, *S. gibbosa* and *S. dayi* collected from gill net catches. The parasites were dissected out from the dermal bore in the tissues of the host fish and identified. The type material will be deposited in the National Collection of Zoological Survey of India, Calcutta.

Peroderma sardinellae sp. nov.
(Figs. 1-14)

Female: Body elongate, irregularly cylindrical and divided into head, neck and trunk. Trunk elongated and cylindrical, club-shaped at anterior end, posterior end slightly broad having three bulbous swellings. The neck projection arises at right angles to the trunk. The origin of the neck is towards the anterior region, its position lies at 39-41% of the total length of the trunk. Body surface not smooth, lateral surface anterior to the origin of neck with about 7 projections which may help to get a hold inside the host tissue. The neck is a chitinous, irregular tube, bearing head and oral appendages at its distal end. The broad base of the neck is easily separable from the trunk. Neck hollow and opens

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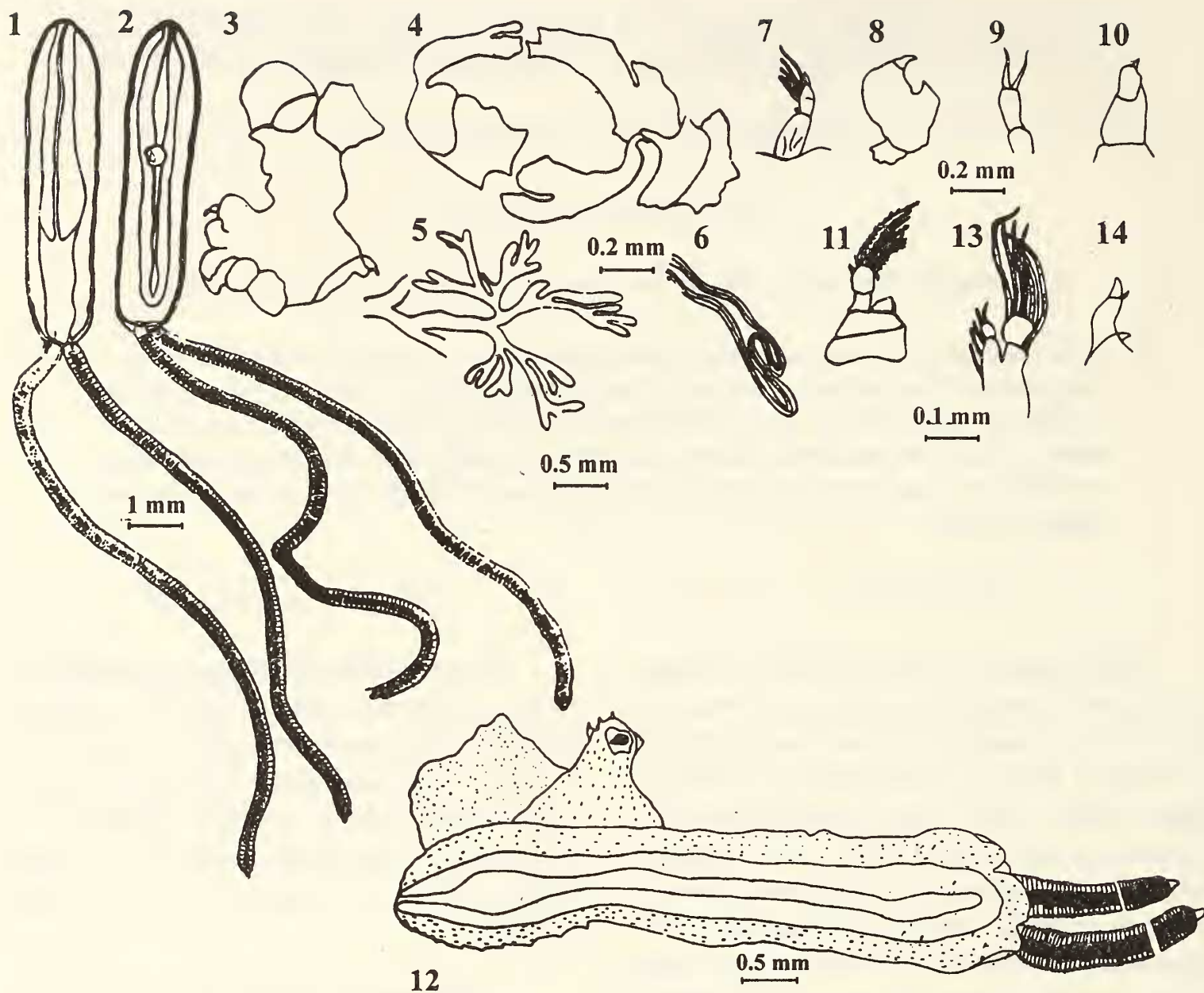


Fig. 1-14: Various body parts of *Peroderma sardinellae* sp. nov.: 1. Dorsal view; 2. Ventral view; 3. Oral tube; 4. Anterior portion of oral tube; 5. A branch of absorbing and anchoring roots; 6. An absorptive root; 7. Antennule; 8. Antenna; 9. Maxilla; 10. Maxilliped; 11. First walking leg; 12. Lateral view of the parasite; 13. Second walking leg; 14. Third walking leg.

into the trunk through a large, apparently bipartitioned opening.

The oral tube at its distal end bears a bunch of six irregularly branched chitinous, double walled, plate-like absorptive and anchoring roots which anastomose to deeper body tissues. The dorsal surface of the body is ridged by a pair of long rod-like structures that run longitudinally along the body. These join together to form a tube and open at the anterior region of the trunk. A similar structure is found on the ventral side, extending only upto the

origin of the neck. This structure may be associated with the secretion of a proteolytic enzyme to aid in drilling into the body tissues of the host fish.

Antennules three-segmented, distal segment quite indistinct. Basal segment broad, bearing a single short seta; two distal segments bearing six long non-plumose setae, of which all except the first are long. The second and third antennular setae show signs of segmentation. Antenna three-segmented and appears chelate. First segment small, second segment large and

NEW DESCRIPTIONS

TABLE I
DIFFERENCES IN THE CHARACTERS OF THE THREE SPECIES OF *PERODERMA* HELLER

<i>Peroderma cylindricum</i> Heller	<i>Peroderma tasselum</i> Bennet	<i>Peroderma sardinellae</i> . sp. nov.
Trunk short, cylindrical, a little bent, smooth with slight dorso-ventral flattening.	Trunk elongated, bent to dorsal side, irregularly cylindrical.	Trunk elongate, straight, uniformly cylindrical bearing many ridges and undulations on dorsal, ventral and lateral sides.
Pre-neck region of trunk cylindrical, nearly 17% of total length of trunk (Bennet 1961)	Pre-neck region of trunk swollen, nearly 50% of total length of trunk.	Pre-neck region club-shaped, 39-41% of total length of trunk.
Neck narrow, cylindrical, a little elongated and attached at right angles to trunk.	Neck short, narrow and cylindrical, attached at an angle with the trunk.	Neck stout, irregular, chitinous jacketed tube, attached not at right angles to the trunk.
Head somewhat globular, irregularly lobed with a bunch of long rhizoid-like outgrowths originating from middle of ventral surface of head. Mouth tube bulbous and slightly protruding, its free border fringed with fine hairs.	Head swollen and rounded, its dorsal surface with three unequal bulges, two lateral and one median, with a bunch of long, branched, tessellate filaments originating from ventral surface of the head anterior to oral appendages. Mouth tube protruding, marginal membranes fringed with hairs.	Head chitinous, swollen and sub circular, bearing 6-7 irregular bulges and carrying numerous elongated narrow chitinous jacketed absorptive filaments or roots which are distally branched in most filaments. Mouth tube not protruding, margin bordered with irregular, plate-like structures, marginal hairs absent.
Antennules somewhat club-shaped, three jointed structures carrying several stiff setae, third joint long with a long seta.	Antennules short, three segmented. Basal segment of antennule with three setae of which one is on the inter margin, middle segment with two setae and distal segment with seven setae of which the first and last are long.	Antennules long, three-segmented. Basal segment broad and bears a single short seta, distal two segments bear six non-plumose setae of which all except first are long. Distal segment less distinct.
Antenna three-jointed, sub-chelate, prehensile. First is short, second stout with its inner distal part produced into a triangular process against which the long fulcate third joint closes.	Antenna three segmented and chelate. First segment is stout and powerful. Second also stout but shorter than first, both with accessory structures. Third segment is a powerful chela.	Antenna three-segmented, chelation not clear. First segment small. Second segment stout. Third small and conical in shape.
Maxillipeds three-jointed, third joint slightly curved, second joint bearing numerous small blunt accessory claws.	Maxillipeds three-jointed, third joint in the form of a short claw provided with spinules along margin, second elongated and with a blunt spine at lower distal part. First segment thick and large.	Maxillipeds three-jointed. Third joint small, conical in shape, second segment long and curved and bearing a small spine at the distal part. First segment broad, bears a claw at distal end.
First pair of legs long, biramous, terminal rami bearing six simple setae.	First pair of legs biramous, terminal rami bearing seven simple setae.	First pair of legs biramous, terminal rami bearing six long denticles carrying setae.
Third pair of legs uniramous, indistinctly two-jointed and bearing a few short spines.	Third leg uniramous, three small segments without setae or spines.	Third leg uniramous, three segmented, distal segment bears small spine.
Posterior region of trunk narrow, caudal end without swelling. Furcal rami distinct.	Posterior region of trunk narrow, caudal end with bulbous swelling, furcal rami indistinct.	Posterior region of trunk cylindrical with an apparent notch on posterior side, caudal with three bulbous projections, furcal rami distinct.

stout, third segment small and conical. The chitinous projection on the inner side of the mouth tube is considered to be the mandible. The maxillae on either side of the buccal tube are two segmented, the distal segment with a pair of fine setae. Maxilliped three-jointed, the first segment broad, bearing a claw at its distal end. Second segment long and curved, bearing a small spine distally. Third segment small and conical in shape. Three pairs of legs are present in the neck region; first two pairs biramous, third uniramous. The details of structures in the first pair of legs are not clear. The basis of first pair of legs is broad and coxa is short. One ramus of first pair of legs bears two segments which bear two pointed spinous projections and six denticles bearing many minute setae. Second leg biramous with one ramus bearing six fine long denticles and the other only five denticles. The denticles appear to be segmented with no setae. The third leg is uniramous, three segmented and the distal segment bears a small spine. Caudal region of trunk has three bulbous projections, bearing two long uniseriate filamentous egg-strings which are about 2.61 times longer than the length of the parasite. Two very small caudal furca are attached just beneath the origin of the ovisac.

P. sardinellae is similar to *P. cylindricum* Heller and *P. tasselum* Bennet in the mode of attachment to the host, the elongate body with neck roughly at right angles to the trunk, in the structure of oral appendages, segmentation of two pairs of biramous legs and the presence of uniseriate filamentous ovisac. However, there are differences from these two species, as listed in Table 1 and discussed below.

From Table 1 it may be seen that the present species differs from *P. tasselum* in the shape of the trunk, position of neck in the trunk, length of pre-neck region, absence of tassel-like head process with nodulations, the structure of antennules, antennae, maxillipeds, first and second pairs of walking legs, and in the shape of the posterior region of the trunk. These differences may be used to separate the present species from *P. tasselum*. The new species differs from *P. cylindricum* in the presence of a straight, uniformly cylindrical trunk with rough body surface; the presence of club-shaped pre-neck region covering 39%-41% of the total trunk length, presence of stout, irregular chitinous neck not originating exactly at right angles; the absence of sub-globular head with irregular lobes; rhizoid-like head process originating from a common head peduncle, mouth tube with marginal hairs; the presence of first pair of legs bearing six denticles carrying setae and three-segmented third leg without spines and terminal claw and in the shape of the posterior region of the trunk.

The specimens are thus of a new species belonging to the genus *Peroderma* and are named *Peroderma sardinellae* sp. nov.

Collection Data:

Holotype	:	female
Paratype	:	26 females
India	:	Tamil Nadu, Bay of Bengal, Porto Novo
ex.	:	<i>Sardinella albella</i> , <i>Sardinella gibbosa</i> , <i>Sardinella dayi</i> ; 16.v.1990
coll.	:	A.J.A. Ranjit Singh

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